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EXAMINER	
LE, LANA N	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/784,838	JOHNSON, RICHARD A.	
	Examiner	**Art Unit**	
	Lana N. Le	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _16 April 2008_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-46_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-46_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1, 5-6 are rejected under 35 U.S.C. 102(a) as being anticipated by the admitted prior art.

Regarding claim 1, the admitted prior art discloses a tuner (fig. 2) comprising: a direct digital frequency synthesizer (82) having an output terminal for providing a digital local oscillator signal having a frequency chosen to mix a channel to a desired frequency; and a mixer (86) having a first input terminal for receiving a radio frequency signal (RF), a second input terminal coupled to the output terminal of the direct digital frequency synthesizer (84) via 84, and an output terminal for providing an output analog signal at a desired frequency (para. 6).

Regarding claim 5, the admitted prior art discloses the tuner of claim 4, wherein the radio frequency signal represents a radio band signal (para. 3, 6).

Regarding claim 6, the admitted prior art discloses the tuner of claim 5, wherein the radio band signal is an FM radio signal (para. 3).

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claim 29-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim et al (US 7,035,595).

Regarding claim 29, Kim et al disclose a method for tuning a signal comprising the steps of:

generating a digital local oscillator signal using a direct digital frequency synthesizer (207) having a frequency chosen to mix a channel to a desired frequency;
receiving an analog radio frequency signal (via 202); and
mixing the radio frequency signal with the digital local oscillator signal (from 205) to provide an analog output signal (analog output before ADC 210) at the desired frequency (fig. 2A; col 4, lines 1-44).

Regarding claim 30, Kim et al disclose the desired frequency of the output signal is at baseband (col 4, lines 50-51).

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Bugeja (US 7,016,654).

Regarding claim 2, the admitted prior art disclose the tuner of claim 1, wherein the admitted prior art does not disclose the desired frequency of the output signal is at baseband. Bugeja discloses a mixed output signal at baseband (figs. 1a & 1b; col 3, lines 20-37). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a mixed signal at baseband in order to have an RF and a baseband segment wherein power consumption is scalable according to bandwidth utilized for saving power as suggested by Bugeja (col 1, lines 45-54).

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Cowley (US 2002/0,177,423).

Regarding claim 3, the admitted prior art disclose the tuner of claim 1, wherein the admitted prior art do not disclose the radio frequency signal (Rs) comprises a plurality of channels and wherein the desired frequency of the output signal is less than or equal to three channel widths. Cowley discloses the radio frequency signal comprises a plurality of channels and wherein the desired frequency of the output signal is less than or equal to three channel widths (para. 31). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the desired frequency be less than or equal to three channel widths in order to provide a low

intermediate frequency signal to align the tuner onto a desired channel centered on a low intermediate frequency as suggested by Cowley.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Birleson et al (US 6,177,964).

Regarding claim 4, the admitted prior art disclose the tuner of claim 1, wherein the admitted prior art do not specifically disclose the radio frequency signal comprises a plurality of channels and wherein the desired frequency of the output signal is greater than three channel widths. However, it is notoriously old and well known in the art to have the desired frequency be greater than three channel widths as in high or regular intermediate frequencies as taught by Bireleson et al (col 8, lines 10-12). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the frequency be greater than three channel widths in order to convert the received RF signal to an appropriate intermediate frequency.

7. Claims 18, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Sakamoto (US 4,361,906) and further in view of Oosawa et al (US 2005/0,239,499).

Regarding claim 18, the admitted prior art disclose the tuner of claim 7, wherein the admitted prior art do not disclose the tuner comprises at least an additional receive path comprising: a second direct digital frequency synthesizer having an output terminal for providing a digital local oscillator signal having a frequency chosen to mix a channel to a desired frequency; and a second mixer having a first input terminal for receiving a radio frequency signal, a second input terminal coupled to the output terminal of the

second direct digital frequency synthesizer, and an output terminal for providing a second output signal at a desired frequency. Sakamoto discloses a tuner comprises at least the additional receive path (56, 29, 48,49-54, 31) comprising: a second direct digital frequency synthesizer (second PLL synthesizer; col 2, lines 45-58) having an output terminal for providing a digital local oscillator signal having a frequency chosen to mix a channel to a desired frequency; and a second mixer (48) having a first input terminal for receiving a radio frequency signal (WsubRF), a second input terminal coupled to the output terminal of the second direct digital frequency synthesizer, and an output terminal for providing a second output signal at a desired frequency. Although Sakamoto do not disclose the second synthesizer is digital, it is well known and notoriously old in the art to have the synthesizer of Sakamoto digital as well in order to output digital oscillator signals in a complex domain. The admitted prior art and Sakamoto do not disclose one additional receive path on the single integrated circuit. Oosawa disclose one additional receive path on the single integrated circuit (para. 18; fig. 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to integrate the additional receive path in order to utilize a light and small multi band receiver with most of its functional components combined in an integrated circuit.

Regarding claim 20, the admitted prior art, Sakamoto and Oosawa disclose the tuner of claim 18, wherein Sakamoto discloses the first mixer (137, 143) and the second mixer receive a radio frequency signal in different frequency bands (col 9, lines 56-68).

8. Claim 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Sakamoto (US 4,361,906) and further in view of Oosawa et al (US 2005/0,239,499) and further in view of Yano et al (US 6,711,149).

Regarding claim 19, the admitted prior art, Sakamoto and Oosawa disclose the tuner of claim 18, wherein the admitted prior art, Sakamoto and Oosawa do not disclose the first mixer and the second mixer receive a radio frequency signal within the same frequency band. Yano et al disclose the two receivers receive a radio frequency signal within the same frequency band (col 11, lines 22-29). It would have been obvious to one of ordinary skill in the art at the time the invention was made to receive within the same band in order to allow the receiver to receive simultaneously from two different remote stations as suggested by Yano et al.

9. Claims 21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Sakamoto (US 4,361,906).

Regarding claims 21, the admitted prior art disclose the tuner of claim 7, wherein the admitted prior art does not disclose the radio frequency signal represents a television signal. Sakamoto et al disclose the RF signal represents a television signal (col 1, lines 40-43). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the tuner of the admitted prior art tune a television signal in order to tune to a desired TV channel for the user.

Regarding claim 25, the admitted prior art discloses the tuner of claim 7, wherein the admitted prior art does not specifically disclose the tuner comprising an oscillator having a clock signal as an output, the mixer being configured to receive the clock

signal and the direct digital frequency synthesizer being configured to receive the clock signal through a divider. Sakamoto discloses a phase locked loop comprising an oscillator (25) having a clock signal as an output, a mixer (48) being configured to receive the clock signal and the direct digital frequency synthesizer (18-22, 30-31) being configured to receive the clock signal through a divider (26). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a clock signal in order to phase compare to lock the local clock source to the received timing information.

13. Claims 13, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Stone et al (5,251,218).

Regarding claims 13, the admitted prior art discloses the tuner of claim 1, wherein the admitted prior art does not disclose the direct digital frequency synthesizer further comprises an input terminal for receiving a tuning signal corresponding to a desired channel and is configured to provide the digital local oscillator signal at a frequency determined at least in part by the tuning signal. Stone et al disclose the direct digital frequency synthesizer (111) further comprises an input terminal for receiving a tuning signal (control input) corresponding to a desired channel and is configured to provide the digital local oscillator signal (cos, sin outputs) at a frequency determined at least in part by the tuning signal (col 5, lines 32-41). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the synthesizer of the admitted prior art have an input signal in order to provide a signal indicative of a selected channel to be tuned as suggested Stone et al.

Regarding claim 22, the admitted prior art discloses the tuner of claim 21, wherein the admitted prior art does not disclose the tuner further comprising

a second mixer having a first input terminal for receiving the radio frequency signal, a second input terminal, and an output terminal for providing a quadrature signal, wherein the direct digital frequency synthesizer further has a second output terminal coupled to the second input terminal of the second mixer for providing for providing a phase-shifted digital local oscillator signal. Stone et al disclose a second mixer (121) having a first input terminal for receiving the radio frequency signal (Rs), a second input terminal (input terminal to receive signal from 111), and an output terminal for providing a quadrature signal (Q), wherein the direct digital frequency synthesizer (111) further has a second output terminal coupled to the second input terminal of the second mixer (121) for providing for providing a phase-shifted digital local oscillator signal (sin LO output) (figs. 1 & 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a second mixer coupled to the synthesizer in order to downconvert the RF signal to a complex domain baseband signal as suggested by Stone et al.

11. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Stone et al and further in view of Hedstrom (WO 97/06604).

Regarding claim 23, the admitted prior art and Stone disclose the tuner of claim 22, where they do not disclose the tuner comprising a converter circuit configured to convert the output signals from the first and second mixers to a predetermined center frequency. Hedstrom discloses a converter circuit (132, 134) configured to convert the

output signals from the first and second mixers (54, 58) to a predetermined center frequency. It would have been obvious to one of ordinary skill in the art at the time the invention was made to convert the output of the first and second mixers to a predetermined frequency in order to provide further conversion to a desired frequency to detect a stronger signal.

14. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over The admitted prior art in view of Stone et al in view of Hedstrom (WO 97/06604) and further in view of Birleson et al (US 6,177,964).

Regarding claim 24, the admitted prior art, Stone et al, and Hedstrom disclose the tuner of claim 23, wherein the admitted prior art and Hedstrom do not disclose the tuner further comprising a second direct digital frequency synthesizer having an output coupled to the converter circuit. Birleson et al disclose a second direct digital frequency synthesizer (32) having an output coupled to the converter circuit (204). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a second synthesizer in order to separately control the local oscillator inputs.

17. Claims 7, 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Tomasz et al (US 2001/0,041,532).

Regarding claims 7, the admitted prior art disclose the tuner of claim 1, wherein the admitted prior art does not disclose the direct digital frequency synthesizer and the mixer are combined in a single integrated circuit. Tomasz et al disclose the direct digital frequency synthesizer (500) and the mixer (124, 126) are combined in a single integrated circuit (120); (fig. 7; para. 22). It would have been obvious to one of ordinary

skill in the art at the time the invention was made to have the mixer and synthesizer combined in an integrated circuit in order to reduce the size of the downconverter circuit for compactness.

Regarding claim 27, the admitted prior art and Tomasz et al disclose the tuner of claim 7, wherein the admitted prior art disclose the radio frequency signal represents a radio band signal (para. 3, 6).

Regarding claim 28, the admitted prior art and Tomasz et al disclose the tuner of claim 27, wherein the admitted prior art discloses the radio band signal is an FM radio signal (paras. 3, 6).

19. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al in view of Cowley (US 2002/0,177,423).

Regarding claim 31, Kim et al disclose the method of tuning of claim 29, wherein Kim et al do not disclose the radio frequency signal (Rs) comprises a plurality of channels and wherein the desired frequency of the output signal is less than or equal to three channel widths. Cowley discloses the radio frequency signal comprises a plurality of channels and wherein the desired frequency of the output signal is less than or equal to three channel widths (para. 31). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the desired frequency be less than or equal to three channel widths in order to provide a low intermediate frequency signal to align the tuner onto a desired channel centered on a low intermediate frequency as suggested by Cowley.

6. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al in view of Birleson et al (US 6,177,964).

Regarding claim 32, Kim et al disclose the method of tuning of claim 29, wherein Kim et al do not specifically disclose the radio frequency signal comprises a plurality of channels and wherein the desired frequency of the output signal is greater than three channel widths. However, it is notoriously old and well known in the art to have the desired frequency be greater than three channel widths as in high or regular intermediate frequencies as taught by Bireleson et al (col 8, lines 10-12). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the frequency be greater than three channel widths in order to convert the received RF signal to an appropriate intermediate frequency.

7. Claims 38 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al in view of Sakamoto (US 4,361,906) and further in view of Oosawa et al (US 2005/0,239,499).

Regarding claim 38, Kim et al disclose the method of tuning of claim 33, wherein Kim et al do not disclose the tuner comprises at least an additional receive path comprising: a second direct digital frequency synthesizer having an output terminal for providing a digital local oscillator signal having a frequency chosen to mix a channel to a desired frequency; and a second mixer having a first input terminal for receiving a radio frequency signal, a second input terminal coupled to the output terminal of the second direct digital frequency synthesizer, and an output terminal for providing a second output signal at a desired frequency. Sakamoto discloses a tuner comprises at least the

additional receive path (56, 29, 48,49-54, 31) comprising: a second direct digital frequency synthesizer (second PLL synthesizer; col 2, lines 45-58) having an output terminal for providing a digital local oscillator signal having a frequency chosen to mix a channel to a desired frequency; and a second mixer (48) having a first input terminal for receiving a radio frequency signal (WsubRF), a second input terminal coupled to the output terminal of the second direct digital frequency synthesizer, and an output terminal for providing a second output signal at a desired frequency. Although Sakamoto do not disclose the second synthesizer is digital, it is well known and notoriously old in the art to have the synthesizer of Sakamoto digital as well in order to output digital oscillator signals in a complex domain. Kim et al and Sakamoto do not disclose one additional receive path on the single integrated circuit. Oosawa disclose one additional receive path on the single integrated circuit (para. 18; fig. 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to integrate the additional receive path in order to utilize a light and small multi band receiver with most of its functional components combined in an integrated circuit.

Regarding claim 40, Kim et al, Sakamoto and Oosawa disclose the method of tuning of claim 38, wherein Sakamoto discloses the first mixer (137, 143) and the second mixer receive a radio frequency signal in different frequency bands (col 9, lines 56-68).

8. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al in view of Sakamoto (US 4,361,906) and further in view of Oosawa et al (US 2005/0,239,499) and further in view of Yano et al (US 6,711,149).

Regarding claim 39, Kim et al, Sakamoto and Oosawa disclose the method of tuning of claim 38, wherein Kim et al, Sakamoto and Oosawa do not disclose the first mixer and the second mixer receive a radio frequency signal within the same frequency band. Yano et al disclose the two receivers receive a radio frequency signal within the same frequency band (col 11, lines 22-29). It would have been obvious to one of ordinary skill in the art at the time the invention was made to receive within the same band in order to allow the receiver to receive simultaneously from two different remote stations as suggested by Yano et al.

9. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al in view of Sakamoto (US 4,361,906).

Regarding claim 41, Kim et al disclose the method of tuning of claim 33, wherein Kim et al does not disclose the radio frequency signal represents a television signal. Sakamoto et al disclose the RF signal represents a television signal (col 1, lines 40-43). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the tuner of Kim et al tune a television signal in order to tune to a desired TV channel for the user.

10. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al in view of Sakamoto (US 4,361,906) and further in view of Hedstrom (WO 97/06604).

Regarding claim 42, Kim et al and Sakamoto disclose the tuner of claim 41, where Kim et al and Sakamoto do not disclose the method where the desired frequency of the output signal is at baseband and further comprising converting the output signal from baseband to a predetermined center frequency utilizing a second digital local oscillator

signal. Hedstrom discloses a method wherein the desired frequency of the output signal is at baseband (via 54, 58) and further comprising converting the output signal from baseband to a predetermined center frequency (via 132, 134) utilizing a second digital local oscillator signal.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to convert the output of the first and second mixers to a predetermined frequency in order to provide further conversion to a desired frequency to detect a stronger signal.

12. Claims 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al in view of Staszewski et al (US 2003/0,083,033).

Regarding claim 34, Kim et al disclose the method of claim 29, wherein Kim et al do not disclose the mixing step comprises converting the radio frequency signal to at least one current signal; and mixing the at least one current signal with the output from the direct digital frequency synthesizer. Staszewski et al disclose a method for converting the radio frequency signal to at least one current signal and mixing the at least one current signal with the output from the direct digital frequency synthesizer. (para. 52, 101; figs. 11a, 14). It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the mixer of Stone et al with the mixer of Staszewski et al in order to reduce power consumption by generating clock signals that can be shared by the different signal paths.

Regarding claim 35, Kim et al and Staszewski et al disclose the method of claim 34, wherein Staszewski disclose the radio frequency signal, the current signal, and the

output signal comprise differential signals (para. 73; figs. 11a, 14).

Regarding claim 36, Kim et al and Staszewski et al disclose the method of claim 34, wherein Staszewski et al disclose the converting step comprises generating a plurality of current signals using a plurality of transconductor cells (para. 101; fig. 14).

13. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al in view of Stone et al (5,251,218).

Regarding claim 37, Kim et al discloses the method of tuning of claim 29, wherein Kim et al does not disclose the direct digital frequency synthesizer further comprises an input terminal for receiving a tuning signal corresponding to a desired channel and is configured to provide the digital local oscillator signal at a frequency determined at least in part by the tuning signal. Stone et al disclose the direct digital frequency synthesizer (111) further comprises an input terminal for receiving a tuning signal (control input) corresponding to a desired channel and is configured to provide the digital local oscillator signal (cos, sin outputs) at a frequency determined at least in part by the tuning signal (col 5, lines 32-41). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the synthesizer of Kim et al have an input signal in order to provide a signal indicative of a selected channel to be tuned as suggested Stone et al.

15. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al in view of Tomasz et al (US 2001/0,041,532) and further in view of Sakamoto (US 4,361,906).

Regarding claim 43, Kim et al, Tomasz et al disclose the method of claim 33, wherein Kim et al and Tomasz et al do not disclose the method further comprising providing a reference clock signal and utilizing the reference clock signal in the generating and mixing steps. Sakamoto disclose the method comprising providing a reference clock signal (from reference oscillator 25) and utilizing the reference clock signal in the generating and mixing steps (col 2, lines 45-58). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a reference clock signal in order to phase compare to lock the local clock source to the received timing information.

16. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al in view of Sakamoto (US 4,361,906) and further in view of Staszewski et al (US 2003/0,083,033).

Regarding claim 44, Kim et al and Sakamoto disclose the method of claim 43, wherein Kim et al and Sakamoto do not disclose the mixing step comprises converting the radio frequency signal to M current signals, generating an M-bit digital signal from the digital local oscillator signal, and mixing the M current signals with the M-bit digital signal to provide the output signal at the desired frequency. Staszewski et al disclose a mixing step comprises converting the radio frequency signal to M current signals, generating an M-bit digital signal from the digital local oscillator signal, and mixing the M current signals with the M-bit digital signal to provide the output signal at the desired frequency (para. 52, 101; figs. 11a, 14). It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the mixing of Kim et al with

the mixing of Staszewski et al in order to reduce power consumption by generating clock signals that can be shared by the different signal paths.

17. Claims 33, 45-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al in view of Tomasz et al (US 2001/0,041,532).

Regarding claim 33, Kim et al disclose the method of tuning of claim 29, wherein Kim et al does not disclose the direct digital frequency synthesizer and the mixer are combined in a single integrated circuit. Tomasz et al disclose the direct digital frequency synthesizer (500) and the mixer (124, 126) are combined in a single integrated circuit (120); (fig. 7; para. 22). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the mixer and synthesizer combined in an integrated circuit in order to reduce the size of the downconverter circuit for compactness.

Regarding claim 45, Kim et al and Tomasz et al disclose the method of tuning of claim 33, wherein Kim et al disclose the radio frequency signal represents a radio band signal (para. 3, 6).

Regarding claim 46, Kim et al and Tomasz et al disclose the method of tuning of claim 45, wherein Kim et al discloses the radio band signal is an FM radio signal (paras. 3, 6).

Response to Arguments

Regarding claim 1, applicant argue the AAPA does not disclose "a direct digital frequency synthesizer having an output terminal for providing a digital local oscillator signal" and "a mixer having a second input terminal coupled to the output terminal of the direct digital frequency synthesizer". However, DDFS 82 is a direct digital frequency synthesizer having an output terminal for providing a digital local oscillator signal, and the second input terminal of the mixer is not claimed to be directly coupled to the output terminal of the DDFS. Therefore, rejection to claim 1 is maintained.

Regarding claim 29, applicant argue Kim does not disclose an digital mixing signal but disclose an analog LO pointing to column 4, lines 2-6. However, the examiner have read column 4, lines 2-6 and does not see any citation of an analog local oscillator. Kim discloses a digital synthesizer which control the oscillator to generate a digital mixing signal to mix with the incoming radio frequency to output an analog signal before converting to digital at ADC 210. Therefore, the cited art reads on the claimed limitations.

The dependent claims are argued for the same reasoning as claims 1 and 29, and therefore the rejection to those claims are maintained for the reasons as set forth above.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lana N. Le whose telephone number is (571) 272-7891. The examiner can normally be reached on M-F 10:00-18:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A. Kuntz can be reached on (571) 272-7499. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lana N. Le/
Primary Examiner, Art Unit 2614